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Docket No.: 12468-US-PA

REMARKS

Present Status of the Application

The Advisory Office Action remains rejections on claims 1-7. In Final Action, claims 1-7

are rejected under 35 U.S.C. 103(a) as being unpatentable over Naumov et al. (U. S. Patent

6,875,950; hereinafter Naumov) in view of Girard et al. (U. S. Patent 6,146,813; hereinafter

Girard). In addition, claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Naumov in view of Girard and further in view of Manginell et al. (U. S. patent 6,171,378;

hereinafter Manginell). Claims 1-7 remain pending in the present application, and

reconsideration of those claims is respectfully requested.

Discussions

The Advisory Action states that lasers which are capable of both annealing and trimming

and other processes are well known in the art, and the instant claimed apparatus broadly

describes a "laser annealing apparatus" (Emphasis added).

Applicants respectfully traverse the rejections for at least the reasons set forth below.

1. As previously mentioned, the claimed invention has functionally defined the structure

being different from the prior art. The laser-generating module of the present invention is

defined to operate the annealing on the amorphous silicon. As can be understood by the

ordinarily skilled artisan, the claimed laser will definitely not cut the amorphous silicon. If the

trimming laser of Naumov or the ablating laser of Girard (col. 15, lines 1-14) is used in the

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present invention, the amorphous silicon is then cut and destroyed. Therefore, the annealing

laser in the claimed apparatus is functionally structural difference from the prior art.

Further, in the present invention, the laser annealing energy is dynamically adjusted

according to the measured resistance of the annealed silicon, which is changing from amorphous

silicon to the polysilicon with varying sheet resistance. According to the measured resistance, it

can tell how is the transforming situation for the amorphous silicon being currently transformed

into polysilicon. The laser annealing energy is then properly adjusted to have the sufficient

annealing energy to anneal amorphous silicon but not affect the polysilicon, which has been

currently transformed.

In other words, the laser energy is set to anneal the amorphous silicon to the polysilicon but

not to cut the amorphous silicon. Further, the laser energy is varying, according to the

measured resistance.

2. In general, Naumov and Girard doe not specifically disclose the disclosed laser can be

used to anneal amorphous silicon. As can be understood in ordinary skill, the laser machine for

cutting/trimming electronic device can not be directly used to anneal the amorphous silicon into

polysilicon as recited in claimed invention.

It should be noted that a personal judgment can not be involved in considering

patentability.

3. In Re Naumov, as previously discussed, the laser is used to trim the untrimmed elements

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on the panel 540 (FIG. 5; col. 14, lines 57-63) or used to have a trim cut (ablation) 1120 on other

passive element (Fig. 11; col. 22, lines 21-25). Further, Naumov does not vary the power of

laser once the power is set (col. 15, lines 49-63). Therefore, Naumov does not disclose the

resistance-measurement module of the present invention to measure the resistance of the

annealed silicon, so as to proper adjust the laser energy.

In other words, during the trimming process of Naumov, the laser energy is set to a fixed

energy density to cut material. This laser module is different from the annealing laser module

of the present invention, in which the laser energy density is varying according to the sheet

resistance.

Naumov is functionally different from the claimed invention. Alternatively, Naumov is

nonanalogous to the present invention about annealing amorphous silicon in fabricating

semiconductor device.

4. In re Girard, again, the laser is used to carbonization to form the shunt. As shown in Fig.

5 (col. 7, lines 52-57), the radiant energy source 62, provided by the laser, is set to have

carbonization of the exposed surface 64 while leaving the leads 60 unaffected. Apparently, the

laser is not used for annealing amorphous silicon into polysilicon. The radiant energy source 62

is set to a fixed level without changing. In order to not affect the leads, the leser energy is set

to be just below the ablation threshold during carbonization (col. 15, lines 1-2). The laser

energy is not changed.

Further, since carbonized surface layer 64 of the polyimide substrate 54 is conductive, it can

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provide a discharge pathway (col. 7, lines 58-61). However, the carbonized surface 64 can be removed by applying more fluence of radiation (col. 8, lines 4-7).

Girard is functionally different from the claimed invention. Alternatively, Girard is nonanalogous to the present invention about annealing amorphous silicon in fabricating semiconductor device.

For at least the foregoing reasons, Applicants respectfully submit that independent claim 1 patently defines over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-7 patently define over the prior art references as well.

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CONCLUSION

For at least the foregoing reasons, it is believed that all the pending claims 1-7 of the invention patently define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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